

white-tomentose; ovary inferior, each locule with 2 ovules separated by a false partition; fruits ellipsoid or subglobose, puberulent at first, glaucous, 8–12 mm. in diameter, edible, 6 or more loculed, 4 or more seeded; calyx-lobes persistent, ascending or reflexed, glabrous on both sides or sparsely pubescent within, the margins ciliate; seeds reddish brown, smooth or minutely striate, 3.5–4 mm. long, obliquely lanceoloid or narrowly ovoid.

Type locality. "Regno Mexicano, Prov. Chiapa—fl. february (Linden 1840); Karwinski (herb. Imp. Petrop.)."

Range. Nuevo Leon, Mexico, to Huehuetenango, Guatemala.

Citation of specimens. MEXICO. NUEVO LEON: southwest of Puebla Galeana, C. H. and M. T. Mueller 282 (AA, type of *Amelanchier paniculata*; isotype, FM); about 15 miles southwest of Galeana, C. H. and M. T. Mueller 834 (AA); Hacienda Pablillo, Galeana, Mary Taylor 152 (FM). TAMAULIPAS: Juamave, H. W. von Rozyński 518 (FM); Tula, J. Gregg 599 (GH, syntype of *Amelanchier denticulata* var. *psilantha*). SAN LUIS POTOSI: without definite locality, J. G. Schaffner 460 (AA, FM). CHIAPAS: locality unknown, Linden in 1840 (type, Herb. Mus. Paris; phototype, AA, UI). STATE UNKNOWN: Sessé and Mocino 1012, 2128 (FM). GUATEMALA. HUEHUETENANGO: Chiantla, A. F. Skutch 1125, 1145 (AA, FM), P. C. Standley 65666 (FM); along Aguacatan Road, east of Huehuetenango, P. C. Standley 81964 (FM). STATE UNKNOWN: San Martin (?), J. R. Johnston 1750 (FM).

Department of Botany,
University of Illinois, Urbana.

DISEASES OF FREMONTIA

H. N. HANSEN AND H. EARL THOMAS

The plants of the genus *Fremontia*, a native of the southwestern United States are highly esteemed by many as ornamental subjects for garden and park and no doubt would be much more widely planted except for certain diseases to which they are susceptible, particularly the first of those treated below.

STEM GIRDLING

This disease, caused by the soil-inhabiting water mold *Phytophthora cactorum* Lib. and Cohn., was first brought to our attention in 1934 because of rather heavy losses in young nursery stock. Since that time it has been seen rather frequently in cultivated specimens of varying size up to fifteen feet or so in height. We have not seen the disease on plants in the wild. The principal effect of this disease is the killing of the bark entirely around the stem commonly at or near the ground line but occasionally higher up. The death of the bark is soon followed by withering of all parts distal to the necrotic portion.

The disease was easily induced artificially by inoculation of pot-grown plants with the fungus taken from pure cultures. If the fungus is introduced through wounds, stems about one-half inch in diameter may be completely girdled in forty-eight hours. Even when the fungus is merely placed in contact with uninjured bark, such small plants are often killed within a few days. Plants of three species of *Fremontia*, *F. californica* Torr., *F. napensis* Eastw. and *F. mexicana* (Dav.) Macbr., appear to be about equally susceptible.

The prevalence and destructiveness of this disease seem to be clearly related to excess water and inadequate drainage. At least some of the losses could be avoided by planting in exceptionally well-drained sites and by sparing use of water.

VASCULAR WILT

Another soil-borne fungus, *Verticillium albo-atrum* R. and B., occasionally infects *Fremontia* plants grown under cultivation. The mycelium of this fungus invades seemingly uninjured roots and eventually pervades most of the xylem elements even those of the petioles and leaf veins. The stele is distinctly discolored (pl. 3, fig. A) while the bark appears unchanged. Infected plants are at first stunted and the leaves wilt and soon drop off (pl. 3, fig. B). Death of small plants ensues in three to five months. The disease was produced by artificial inoculation in plants of the three species named above. It has not been seen in plants in their native habitat. No satisfactory control is known.

LEAF SPOT

This disease, caused by the fungus *Hendersonia Fremontiae* (Hark.) comb. nov. (*Ascochyta Fremontiae* Hark.), produces small to large necrotic areas in the leaf blade with typically dark to black margins (pl. 3, fig. D). Harkness (Fungi of the Pacific Coast. Bull. Calif. Acad. Sci. 2: 438-447. 1887.) discovered the disease in 1881 and described the causal organism as follows: "Hypophyllous, scattered, minute, spores pale brown, nearly cylindrical, slightly attenuated at the ends, flexuous, 1-septate, but often appearing 3-septate by division of the endochrome, very unequal in size, 6-12 × 30-40 μ, covering the lower surface of the living leaves of *Fremontia californica*." This description is excellent and enables one to identify the fungus on sight. The three-septate condition of the spores, however, is real and not merely an optical illusion. This becomes clear when the fungus is grown in culture where spores having up to five clearly visible septa are produced. The pale brown color alone would preclude the inclusion of this fungus in the genus *Ascochyta*. The color and multi-septate condition of the conidia and other characteristics place this fungus in the form genus *Hendersonia*. The disease has been found on *Fremontia californica* and *F. napensis* in nature and has

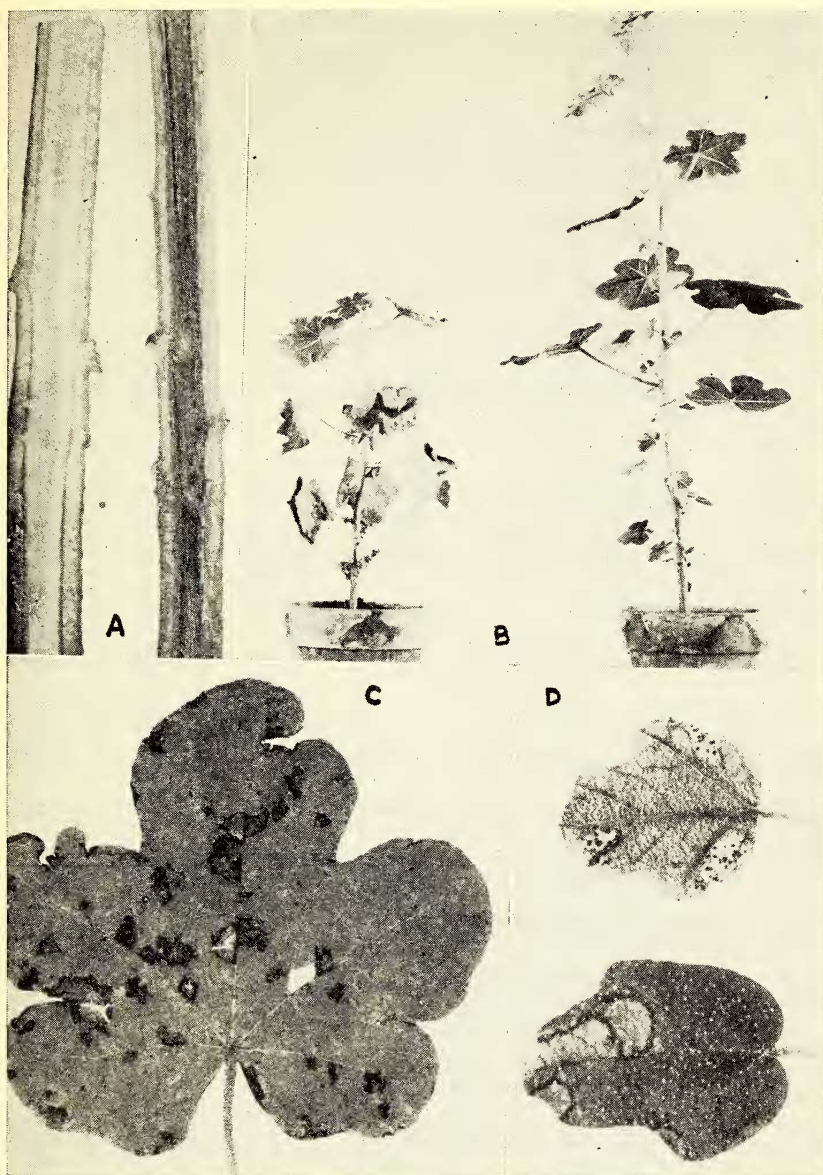


PLATE 3. DISEASES OF FREMONTIA. Fig. A. Longisections through stems of *Fremontia* showing discolored stele of infected plant (right) and stele of healthy plant (left), $\times 1$. Fig. B. *Verticillium*-infected plant (left), control (right), $\times 1/5$. Fig. C. Leaf of *Fremontia californica* showing angular leaf spot, *Septoria angularis*, $\times 1$. Fig. D. Leaf of *Fremontia napensis* affected by *Hendersonia* leaf spot: ventral view showing pycnidia (upper); dorsal view showing black margins of leaf spots (lower).

been produced on these and on *F. mexicana* by artificial inoculation. The injury is seldom severe.

ANGULAR LEAF SPOT

A species of *Septoria* was found to produce small, angular, brown leaf spots (pl. 3, fig. C) which may coalesce to form rather large necrotic areas. Premature defoliation may result where overhead sprinkling is practiced. The small, black pycnidia of the fungus are produced in dense groups beneath the epidermis of the ventral surfaces of the leaves and eventually the ostioles break through to the surface. Conidia from the leaf are one- to three-septate, mostly one-septate, whereas from culture they are one- to many-septate. This fungus does not seem to have been previously described and we therefore submit it as a new species.

Septoria angularis sp. nov. Maculis irregularibus angulatis, fuscis; pycnidiis epiphyllis, subepidermicis, dense gregariis, globosis, 50–70 μ diam., ostiolo minuto perforatis; sporulis oblongis utrinque attenuatis, 1–3-septatis, non constrictis, hyalinis, 10–17 \times 1.5–2 μ ; sporophoris papilli formibus. Hab. in foliis *Fremontiae* (Sterculiaceae) Amer. Bor.

Type. On leaves of *Fremontia mexicana* (Davidson) Macbride; nursery in Morgan Hill, Santa Clara County, California, May, 1935, *Harvey E. Thomas* (Herbarium of the University of California no. 688926).

This leaf spot was found also on *Fremontia* growing in a garden of native plants at Santa Barbara. It has been produced by artificial inoculation on the three species of *Fremontia* mentioned above.

Division of Plant Pathology,
University of California, Berkeley.

NOTES ON THE GENUS ELYMUS

FRANK W. GOULD

Relationships in the *Elymus triticoides*—*E. condensatus*—*E. cinereus* complex of western North America never have been satisfactorily explained, especially in respect to the plants of coastal California. Hitchcock (1) more or less arbitrarily distinguished two species but recognized the possibility of a third entity in the "giant rye grass" of southern California. His discussion of *E. condensatus* is concluded with the statement, "On the coast of California there is a form with robust culms as much as 3 m. tall, compound spikes as much as 30 cm. long and 4 cm. thick, the ascending compound branches sometimes 6 cm. long. This form usually has pronounced rhizomes; possibly distinct." The type of *E. condensatus* from "Monte-Rey, California" has not been examined